Gunter, Jason

From: Seabourne, Rocky <rseabourne@doerun.com>
Sent: Tuesday, December 15, 2015 7:59 AM
To: 'brandon.wiles@dnr.mo.gov'; Gunter, Jason; Montgomery, Michael; Neaville, Chris; Ty Morris; Yingling, Mark
Subject: Emailing: November Progress report (2)
Attachments: November Progress report (2).pdf; 10 - Remediation Air Report - October 2015.pdf; 2015-11-10 RM NPDES Pace Lab Report.pdf

Categories: Red Category

Your message is ready to be sent with the following file or link attachments:

November Progress report (2)

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THE DOE RUN COMPANY

Remediation Group

Rocky Seabourne
General Supervisor Land and Remediation
rseabourne@doerun.com

December 10, 2015

Mr. Jason Gunter
Remedial Project Manager
U.S. Environmental Protection Agency
Region 7 - Superfund Branch
11201 Renner Blvd.
Lenexa, KS 66219

Re: The Doe Run Company – Elvins/Rivermines Mine Tailings Site Monthly Progress Report

Dear Mr. Gunter:

As required by Article VI, Section 56 of the Unilateral Administrative Order (UAO) (CERCLA-07-2005-0169) for the referenced project and on behalf of The Doe Run Company, the progress report for the period November 1, 2015 through November 30, 2015 is enclosed. If you have any questions or comments, please call me at 573-244-8136.

Sincerely,

Rocky Seabourne
General Supervisor Land and Remediation

Enclosures
c: Mark Yingling – TDRC (electronic only)
Chris Neaville – TDRC (electronic only)
Michael Montgomery – TDRC (electronic only)
Brandon Wiles – MDNR
Ty Morris – Barr Engineering

Elvins/Rivermines Mine Tailings Site
Park Hills, Missouri
Removal Action - Monthly Progress Report
Period: November 1, 2015 – November 30, 2015

1. **Actions Performed and Problems Encountered This Period:**
   a. Work continued on the development of the Post-Removal Site Control Plan for the site.
   b. Due to the vandalism that occurred, no flow was discharged into the pilot test or west treatment cell.
   c. Work continued on the construction activities associated with the approved stormwater management plan.

2. **Analytical Data and Results Received This Period:**
   a. During this period, water samples were collected from just upstream of Old Missouri Highway 32, as well as from upstream and downstream of the confluence of the site discharge with Flat River. The analytical results for this event are included with this progress report.
   b. During this period, the ambient air monitoring samples for October were processed and the Ambient Air Monitoring Report for October 2015 was completed and is attached.

3. **Developments Anticipated and Work Scheduled for Next Period:**
   a. Complete the water sampling activities.
   b. Complete air monitoring activities as described in the Removal Action Work Plan.
   c. Continue developing the Post-Removal Site Control Plan.
   d. Continue construction activities associated with the approved stormwater management plan.

4. **Changes in Personnel:**
   a. None.

5. **Issues or Problems Arising This Period:**
   a. None.

6. **Resolution of Issues or Problems Arising This Period:**
   a. None.

Monthly Ambient Air Monitoring Report

The Doe Run Company
Old Lead Belt Sites:
Federal, Rivermines, National, and Leadwood

October-2015

THE DOE RUN COMPANY
150 YEARS

SUITE 300
1801 PARK 270 DRIVE
ST. LOUIS, MO 63146

Federal Site

Sample Results for **October-2015**

	St. Joe (Ballfields)		Big River#4		Water Treatment Plant	
Sample Date	**TSP** ug/m3	**Lead** ug/m3	**TSP** ug/m3	**Lead** ug/m3	**TSP** ug/m3	**Lead** ug/m3
10/1/15	29	0.007	49	0.007	33	0.014
10/2/15	28	0.007	49	0.007	invalid	invalid
10/5/15	33	0.021	34	0.007	17	0.013
10/6/15	26	0.021	invalid	invalid	invalid	invalid
10/7/15	25	0.021	invalid	invalid	40	0.132
10/8/15	19	0.007	21	0.013	20	0.028
10/9/15	19	0.014	16	0.007	16	0.007
10/12/15	53	0.043	48	0.007	47	0.056
10/13/15	23	0.007	25	0.007	26	0.048
10/14/15	35	0.014	32	0.013	31	0.021
10/15/15	47	0.007	invalid	invalid	46	0.014
10/16/15	37	0.007	invalid	invalid	invalid	invalid
10/19/15	54	0.014	11	0.000	54	0.014
10/20/15	36	0.014	61	0.034	invalid	invalid
10/21/15	32	0.000	43	0.007	invalid	invalid
10/22/15	invalid	invalid	40	0.007	invalid	invalid
10/23/15	19	0.007	9	0.007	invalid	invalid
10/26/15	19	0.007	18	0.007	invalid	invalid
10/27/15	6	0.007	3	0.000	invalid	invalid
10/28/15	15	0.021	13	0.007	invalid	invalid
10/29/15	13	0.007	12	0.007	invalid	invalid
10/30/15	7	0.007	11	0.007	invalid	invalid

Monthly Avg. TSP	27	28	33
Monthly Avg. Pb	0.012	0.008	0.035
Sep-15	0.011	0.014	0.012
Aug-15	0.012	0.012	0.021
Rolling 3-Month	**0.012**	**0.011**	**0.022**

Three month rolling average must be less than 0.15 ug/m3

	Big River QA	
Sample Date	**TSP** ug/m3	**Lead** ug/m3
10/1/15	49	0.007
10/6/15	invalid	invalid
10/8/15	invalid	invalid
10/13/15	invalid	invalid
10/15/15	invalid	invalid
10/20/15	60	0.026
10/22/15	38	0.013
10/27/15	4	0.000
10/29/15	na	na

Notes

Electrical connections have all been upgraded to code. Water Treatment Plant site is awaiting utillitiy company service upgrade.

Big River QA sample from 10/29/15 was missing.

Rivermines

Sample Results for **October-2015**

	Big River #4		Rivermines South #1		Rivermines North #2		Rivermines East #3	
Sample Date	**TSP** ug/m3	**Lead** ug/m3	**TSP** ug/m3	**Lead** ug/m3	**TSP** ug/m3	**Lead** ug/m3	**TSP** ug/m3	**Lead** ug/m3
10/1/15	49	0.007	98	0.248	invalid	invalid	33	0.014
10/2/15	49	0.007	invalid	invalid	invalid	invalid	invalid	invalid
10/5/15	34	0.007	89	0.334	15	0.007	17	0.013
10/6/15	invalid	invalid	invalid	invalid	invalid	invalid	invalid	invalid
10/7/15	invalid	invalid	103	0.352	31	0.053	40	0.132
10/8/15	21	0.013	invalid	invalid	20	0.007	20	0.028
10/9/15	16	0.007	21	0.020	19	0.007	16	0.007
10/12/15	48	0.007	71	0.055	45	0.007	47	0.056
10/13/15	25	0.007	60	0.116	38	0.075	26	0.048
10/14/15	32	0.013	75	0.189	32	0.007	31	0.021
10/15/15	invalid	invalid	90	0.195	43	0.007	46	0.014
10/16/15	invalid	invalid	83	0.195	31	0.006	invalid	invalid
10/19/15	11	0.000	46	0.013	50	0.046	54	0.014
10/20/15	61	0.034	56	0.013	60	0.087	invalid	invalid
10/21/15	43	0.007	59	0.035	42	0.042	invalid	invalid
10/22/15	40	0.007	39	0.013	36	0.020	invalid	invalid
10/23/15	9	0.007	10	0.007	10	0.027	invalid	invalid
10/26/15	18	0.007	16	0.013	15	0.007	invalid	invalid
10/27/15	3	0.000	6	0.007	3	0.007	invalid	invalid
10/28/15	13	0.007	12	0.013	9	0.013	invalid	invalid
10/29/15	12	0.007	46	0.062	12	0.013	invalid	invalid
10/30/15	11	0.007	9	0.007	10	0.007	invalid	invalid

Monthly Avg. TSP	28	52	27	33
Monthly Avg. Pb	0.008	0.099	0.023	0.035
Sep-15	0.014	0.077	0.028	0.012
Aug-15	0.012	0.068	0.012	0.021
Rolling 3-Month	**0.011**	**0.081**	**0.021**	**0.022**

Three month rolling average must be less than 0.15 ug/m3

	Big River QA	
Sample Date	**TSP** ug/m3	**Lead** ug/m3
10/1/15	49	0.007
10/6/15	invalid	invalid
10/8/15	invalid	invalid
10/13/15	invalid	invalid
10/15/15	invalid	invalid
10/20/15	60	0.026
10/22/15	38	0.013
10/27/15	4	0.000
10/29/15	na	na

Notes

Electrical connections have all been upgraded to code. Water Treatment Plant site is awaiting utillitiy company service upgrade.

Big River QA sample from 10/29/15 was missing.

Federal Site

Sample Results for **October-2015**

Sample Date	St. Joe (Ballfields) **PM10** (ug/m3)	Big River#4 **PM10** (ug/m3)	Water Treatment **PM10** (ug/m3)
10/3/15	invalid	27	invalid
10/6/15	20	19	23
10/9/15	21	32	14
10/12/15	30	30	26
10/15/15	27	21	27
10/18/15	33	31	30
10/21/15	29	27	invalid
10/24/15	10	13	11
10/27/15	6	2	invalid
10/30/15	7	11	invalid

Compliance with NAAQS is less than 150 ug/m3

Monthly Avg. PM10	20	21	22

Sample Date	Big River QA **PM10** (ug/m3)
10/3/15	21
10/9/15	16
10/15/15	15
10/21/15	30
10/27/15	8

Notes:

Electrical connections have all been upgraded to code. Water Treatment Plant site is awaiting utillitiy company service upgrade.

Rivermines

Sample Results for **October-2015**

Sample Date	Big River #4 **PM10** (ug/m3)	Rivermines South #1 **PM10** (ug/m3)	Rivermines North #2 **PM10** (ug/m3)	Rivermines East #3 **PM10** (ug/m3)
10/3/15	27	invalid	invalid	invalid
10/6/15	19	41	invalid	23
10/9/15	32	invalid	invalid	14
10/12/15	30	36	11	26
10/15/15	21	8	4	27
10/18/15	31	7	32	30
10/21/15	27	3	30	invalid
10/24/15	13	4	11	11
10/27/15	2	3	4	invalid
10/30/15	11	10	7	invalid

Compliance with NAAQS is less than 150 ug/m3

Monthly Avg. PM10	21	14	14	22

Sample Date	Big River QA **PM10** (ug/m3)
10/3/15	21
10/9/15	16
10/15/15	15
10/21/15	30
10/27/15	8

Notes:

Electrical connections have all been upgraded to code. Water Treatment Plant site is awaiting utillitiy company service upgrade.

Meterological Data - Old Lead Belt
October-2015

24hr average

Date	Wind Speed (MPH)	Wind Direction	Sigma-Theta	Temperature (C)	Air Pressure (mmHg)	Rain (Inches)	Power Supply (Volts)
01-Oct-15	4.208	0.047	23.17	12.73	748	0	13.38
02-Oct-15	5.184	3.901	22.6	12.72	748	0	13.42
03-Oct-15	4.666	12.46	21.8	10.65	745	0	13.46
04-Oct-15	4.696	355	22.55	11.21	747	0	13.45
05-Oct-15	2.188	318.3	22.17	14.48	748	0	13.41
06-Oct-15	2	311.2	25.94	17.8	748	0	13.33
07-Oct-15	1.367	268	27.58	17.19	748	0	13.34
08-Oct-15	1.712	236.3	27.36	19.33	746	0	13.29
09-Oct-15	3.426	331.3	25.4	15.91	748	0.06	13.35
10-Oct-15	1.672	210.2	33.66	13.14	749	0	13.35
11-Oct-15	4.142	204.2	22.24	17.09	742	0	13.36
12-Oct-15	2.804	256.8	27.1	20.13	738	0	13.28
13-Oct-15	2.587	272.6	30.33	15.19	742	0	13.34
14-Oct-15	2.645	240.5	25.77	13.42	745	0	13.36
15-Oct-15	3.099	253	26.28	16.4	747	0	13.35
16-Oct-15	4.085	295.9	20.39	11.27	753	0	13.37
17-Oct-15	2.718	341.6	25.54	5.749	756	0	13.5
18-Oct-15	2.431	169.6	29.29	7.89	756	0	13.5
19-Oct-15	5.597	194.7	20.27	15.4	750	0	13.4
20-Oct-15	6.467	203.4	20.29	19.13	749	0	13.33
21-Oct-15	3.841	206.7	25.31	20.77	749	0	13.28
22-Oct-15	2.522	173.8	25.27	19.47	749	0	13.29
23-Oct-15	6.121	194.3	23.15	18.62	745	0	13.33
24-Oct-15	4.953	271.4	22.51	17.53	745	0	13.32
25-Oct-15	2.414	40.38	23.02	10.58	752	0	13.43
26-Oct-15	3.417	86.1	23.16	11.48	749	0	13.43
27-Oct-15	3.069	107.4	26.07	14.12	741	0.58	13.41
28-Oct-15	3.714	256.5	21.82	13.41	737	0.03	13.41
29-Oct-15	2.801	248.8	21.65	7.05	743	0	13.5
30-Oct-15	2.605	155.2	28.42	8.1	746	0.01	13.51
31-Oct-15	5.081	204.1	20.9	12.88	741	0.25	13.47

INQUEST
ENVIRONMENTAL INC.

3609 Mojave Ct., Ste E ◆ COLUMBIA, MO 65202
(573) 474-8110 ◆ FAX: (573) 474-8371

August 28, 2015

Mr. Greg Henson
Chemist
The Doe Run Company
881 Main Street
Herculaneum, Missouri 63048

RE: Park Hill Monitoring Network 3rd Quarter 2015 Lead/PM10 Samplers and Meteorological System Performance Audit Report.

Dear Mr. Henson,

Please find enclosed the worksheets detailing the Lead/PM10 sampler's one-point flow verifications and meteorological sensors accuracy checks that were recently performed on the Doe Run Park Hills Monitoring Network. A copy of the current certifications for the audit devices that were used has also been enclosed.

All of the verifications and checks were found to be within expected guidelines.

After reviewing the enclosed information, please feel free to call with any comments or questions. Thank you for your business.

Sincerely,

John A. Kunkel
Inquest Environmental, Inc.

PM10 Sampler Verifications

INQUEST
Environmental, Inc.

PM10 Sampler Audit
Volumetric Flow Control

3609 Mojave Court, Suite E
Columbia, Missouri 65202
573-474-8110

Date	July 29, 2015	Auditor	John Kunkel
Operator	The Doe Run Company	Transfer Orifice	1882
Location	Park Hills Network	Slope (Qa)	1.04094
Station	Big River	Intercept (Qa)	-0.00876
Sampler	#4 Primary PM10	Temperature	28.3 °C / 301.5 °K
Flow Controller	P2952	Station Pressure	30.08 "Hg / 764.0 mmHg

Flow Rate Audit

Transfer Orifice		Sampler				Flow Rate Percent Difference	Acceptable Range
Manometer "H_2O	Flow Rate m^3/min	Manometer "H_2O	Pressure (Pf)	Press. Ratio (Po/Pa)	Flow Rate m^3/min		
3.30	1.105	25.40	47.44	0.938	1.139	**3.08**	± 7%

Sampler Operating Flow Rate

Manometer "H_2O	Pressure (Pf)	Press. Ratio (Po/Pa)	Flow Rate m^3/min	Corrected Flow Rate	Design % Difference	Acceptable Range
25.60	47.81	0.937	1.138	1.103	**-2.39**	± 10%

Calculations:

Pressure mmHg (Pf) - ("H_2O/13.6) * 25.4

Pressure Ratio (Po/Pa) - 1-Pf/Pa

Orifice Flow Rate (Qa) - 1/Slope*(Sqrt("H2O*(Ta/Pa))-Intercept)

Sampler Flow Rate (Qa) - Taken from the look-up tables

Flow Rate Percent Difference- (Sampler Flow-Orifice Flow)/Orifice Flow*100

Corrected Flow Rate - Operating Flow*((100-Percent Difference)/100)

Design Percent Difference- (Corrected Flow Rate-1.13)/1.13*100

INQUEST
Environmental, Inc.

PM10 Sampler Audit
Volumetric Flow Control

3609 Mojave Court, Suite E
Columbia, Missouri 65202
573-474-8110

Date	July 29, 2015	Auditor	John Kunkel
Operator	The Doe Run Company	Transfer Orifice	1882
Location	Park Hills Network	Slope (Qa)	1.04094
Station	Big River	Intercept (Qa)	-0.00876
Sampler	#4 QA PM10	Temperature	28.3 °C 301.5 °K
Flow Controller	P1019	Station Pressure	30.08 "Hg 764.0 mmHg

Flow Rate Audit

Transfer Orifice		Sampler				Flow Rate Percent Difference	Acceptable Range
Manometer "H_2O	Flow Rate m^3/min	Manometer "H_2O	Pressure (Pf)	Press. Ratio (Po/Pa)	Flow Rate m^3/min		
3.40	1.121	27.10	50.61	0.934	1.147	**2.32**	± 7%

Sampler Operating Flow Rate

Manometer "H_2O	Pressure (Pf)	Press. Ratio (Po/Pa)	Flow Rate m^3/min	Corrected Flow Rate	Design % Difference	Acceptable Range
27.10	50.61	0.934	1.147	1.120	**-0.88**	± 10%

Calculations:

Pressure mmHg (Pf) - ("H_2O/13.6) * 25.4

Pressure Ratio (Po/Pa) - 1-Pf/Pa

Orifice Flow Rate (Qa) - 1/Slope*(Sqrt("H2O*(Ta/Pa))-Intercept)

Sampler Flow Rate (Qa) - Taken from the look-up tables

Flow Rate Percent Difference- (Sampler Flow-Orifice Flow)/Orifice Flow*100

Corrected Flow Rate - Operating Flow*((100-Percent Difference)/100)

Design Percent Difference- (Corrected Flow Rate-1.13)/1.13*100

INQUEST
Environmental, Inc.

PM10 Sampler Audit
Volumetric Flow Control

3609 Mojave Court, Suite E
Columbia, Missouri 65202
573-474-8110

Date	January 20, 2015	Auditor	John Kunkel
Operator	The Doe Run Company	Transfer Orifice	1882
Location	Park Hills Network	Slope (Qa)	1.04094
Station	St Joe Park	Intercept (Qa)	-0.00876
Sampler	#4 PM10	Temperature	31.8 °C 305.0 °K
Flow Controller	P4353	Station Pressure	30.08 "Hg 764.0 mmHg

Flow Rate Audit

Transfer Orifice		Sampler				Flow Rate Percent Difference	Acceptable Range
Manometer "H_2O	Flow Rate m^3/min	Manometer "H_2O	Pressure (Pf)	Press. Ratio (Po/Pa)	Flow Rate m^3/min		
3.10	1.077	24.90	46.50	0.939	1.136	**5.48**	± 7%

Sampler Operating Flow Rate

Manometer "H_2O	Pressure (Pf)	Press. Ratio (Po/Pa)	Flow Rate m^3/min	Corrected Flow Rate	Design % Difference	Acceptable Range
24.90	46.50	0.939	1.136	1.074	**-4.96**	± 10%

Calculations:

Pressure mmHg (Pf) - ("H_2O/13.6) * 25.4

Pressure Ratio (Po/Pa) - 1-Pf/Pa

Orifice Flow Rate (Qa) - 1/Slope*(Sqrt("H2O*(Ta/Pa))-Intercept)

Sampler Flow Rate (Qa) - Taken from the look-up tables

Flow Rate Percent Difference- (Sampler Flow-Orifice Flow)/Orifice Flow*100

Corrected Flow Rate - Operating Flow*((100-Percent Difference)/100)

Design Percent Difference- (Corrected Flow Rate-1.13)/1.13*100

INQUEST
Environmental, Inc.

PM10 Sampler Audit
Volumetric Flow Control

3609 Mojave Court, Suite E
Columbia, Missouri 65202
573-474-8110

Date	July 29, 2015		Auditor	John Kunkel	
Operator	The Doe Run Company		Transfer Orifice	1882	
Location	Park Hills Network		Slope (Qa)	1.04094	
Station	Rivermines (Wtr Plnt)		Intercept (Qa)	-0.00876	
Sampler	#3 PM10		Temperature	31.8 °C	305.0 °K
Flow Controller	P2951		Station Pressure	30.08 "Hg	764.0 mmHg

Flow Rate Audit

Transfer Orifice		Sampler				Flow Rate Percent Difference	Acceptable Range
Manometer "H_2O	Flow Rate m^3/min	Manometer "H_2O	Pressure (Pf)	Press. Ratio (Po/Pa)	Flow Rate m^3/min		
3.10	1.077	25.50	47.63	0.938	1.147	**6.50**	± 7%

Sampler Operating Flow Rate

Manometer "H_2O	Pressure (Pf)	Press. Ratio (Po/Pa)	Flow Rate m^3/min	Corrected Flow Rate	Design % Difference	Acceptable Range
25.60	47.81	0.937	1.146	1.072	**-5.13**	± 10%

Calculations:

Pressure mmHg (Pf) - ("H_2O/13.6) * 25.4

Pressure Ratio (Po/Pa) - 1-Pf/Pa

Orifice Flow Rate (Qa) - 1/Slope*(Sqrt("H2O*(Ta/Pa))-Intercept)

Sampler Flow Rate (Qa) - Taken from the look-up tables

Flow Rate Percent Difference- (Sampler Flow-Orifice Flow)/Orifice Flow*100

Corrected Flow Rate - Operating Flow*((100-Percent Difference)/100)

Design Percent Difference- (Corrected Flow Rate-1.13)/1.13*100

INQUEST
Environmental, Inc.

PM10 Sampler Audit
Volumetric Flow Control

3609 Mojave Court, Suite E
Columbia, Missouri 65202
573-474-8110

Date	July 29, 2015	Auditor	John Kunkel
Operator	The Doe Run Company	Transfer Orifice	1882
Location	Park Hills Network	Slope (Qa)	1.04094
Station	Rivermines (Quarry)	Intercept (Qa)	-0.00876
Sampler	#1 PM10	Temperature	31.8 °C / 305.0 °K
Flow Controller	P4601	Station Pressure	30.08 "Hg / 764.0 mmHg

Flow Rate Audit

Transfer Orifice		Sampler				Flow Rate Percent Difference	Acceptable Range
Manometer "H_2O	Flow Rate m^3/min	Manometer "H_2O	Pressure (Pf)	Press. Ratio (Po/Pa)	Flow Rate m^3/min		
3.30	1.111	24.60	45.94	0.940	1.121	**0.90**	± 7%

Sampler Operating Flow Rate

Manometer "H_2O	Pressure (Pf)	Press. Ratio (Po/Pa)	Flow Rate m^3/min	Corrected Flow Rate	Design % Difference	Acceptable Range
24.50	45.76	0.940	1.121	1.111	**-1.68**	± 10%

Calculations:

Pressure mmHg (Pf) - ("H_2O/13.6) * 25.4

Pressure Ratio (Po/Pa) - 1-Pf/Pa

Orifice Flow Rate (Qa) - 1/Slope*(Sqrt("H2O*(Ta/Pa))-Intercept)

Sampler Flow Rate (Qa) - Taken from the look-up tables

Flow Rate Percent Difference- (Sampler Flow-Orifice Flow)/Orifice Flow*100

Corrected Flow Rate - Operating Flow*((100-Percent Difference)/100)

Design Percent Difference- (Corrected Flow Rate-1.13)/1.13*100

INQUEST
Environmental, Inc.

PM10 Sampler Audit
Volumetric Flow Control

3609 Mojave Court, Suite E
Columbia, Missouri 65202
573-474-8110

Date	July 29, 2015	Auditor	John Kunkel
Operator	The Doe Run Company	Transfer Orifice	1882
Location	Park Hills Network	Slope (Qa)	1.04094
Station	Rivermines (Above Quarry)	Intercept (Qa)	-0.00876
Sampler	#2 PM10	Temperature	31.8 °C 305.0 °K
Flow Controller	P4507	Station Pressure	30.08 "Hg 764.0 mmHg

Flow Rate Audit

Transfer Orifice		Sampler				Flow Rate Percent Difference	Acceptable Range
Manometer "H_2O	Flow Rate m^3/min	Manometer "H_2O	Pressure (Pf)	Press. Ratio (Po/Pa)	Flow Rate m^3/min		
3.30	1.111	26.00	48.56	0.936	1.136	**2.25**	± 7%

Sampler Operating Flow Rate

Manometer "H_2O	Pressure (Pf)	Press. Ratio (Po/Pa)	Flow Rate m^3/min	Corrected Flow Rate	Design % Difference	Acceptable Range
26.10	48.75	0.936	1.136	1.110	**-1.77**	± 10%

Calculations:

Pressure mmHg (Pf) - ("H_2O/13.6) * 25.4

Pressure Ratio (Po/Pa) - 1-Pf/Pa

Orifice Flow Rate (Qa) - 1/Slope*(Sqrt("H2O*(Ta/Pa))-Intercept)

Sampler Flow Rate (Qa) - Taken from the look-up tables

Flow Rate Percent Difference- (Sampler Flow-Orifice Flow)/Orifice Flow*100

Corrected Flow Rate - Operating Flow*((100-Percent Difference)/100)

Design Percent Difference- (Corrected Flow Rate-1.13)/1.13*100

Lead/TSP Sampler Verifications

INQUEST
Environmental, Inc.

Lead Sampler Audit
Volumetric Flow Control

3609 Mojave Court, Suite E
Columbia, Missouri 65202
573-474-8110

Date	July 29, 2015	Auditor	John Kunkel		
Operator	The Doe Run Company	Transfer Orifice	1882		
Location	Park Hills Network	Slope (Qa)	1.04094		
Station	Big River Primary	Intercept (Qa)	-0.00876		
Sampler	#4 TSP	Temperature	28.3 °C	301.5	°K
Flow Controller	P4557	Station Pressure	30.08 "Hg	764.0	mmHg

Flow Rate Audit

Transfer Orifice		Sampler				Calibration Error %	Acceptable Range
Manometer "H_2O	Flow Rate m^3/min	Manometer "H_2O	Pressure (Pf)	Press. Ratio (Po/Pa)	Flow Rate m^3/min		
3.85	1.193	23.90	44.65	0.942	1.239	**3.86**	± 7%

Sampler Operating Flow Rate

Manometer "H_2O	Pressure (Pf)	Press. Ratio (Po/Pa)	Flow Rate m^3/min	Corrected Flow Rate	Acceptable Range
23.00	42.97	0.944	1.242	**1.194**	1.10 - 1.70

Calculations:

Pressure mmHg (Pf) - "H_2O * 1.86832

Pressure Ratio (Po/Pa) - 1-Pf/Pa

Orifice Flow Rate (Qa) - 1/Slope*(Sqrt("H2O*(Ta/Pa))-Intercept)

Sampler Flow Rate (Qa) - Taken from the look-up tables

Calibration Error - (Sampler Flow-Orifice Flow)/Orifice Flow*100

Corrected Flow Rate - Operating Flow*((100-Calibration Error)/100)

INQUEST
Environmental, Inc.

Lead Sampler Audit
Volumetric Flow Control

3609 Mojave Court, Suite E
Columbia, Missouri 65202
573-474-8110

Date	July 29, 2015	Auditor	John Kunkel
Operator	The Doe Run Company	Transfer Orifice	1882
Location	Park Hills Network	Slope (Qa)	1.04094
Station	Big River QA	Intercept (Qa)	-0.00876
Sampler	#4 TSP	Temperature	28.3 °C 301.5 °K
Flow Controller	P4558	Station Pressure	30.08 "Hg 764.0 mmHg

Flow Rate Audit

Transfer Orifice		Sampler				Calibration Error %	Acceptable Range
Manometer "H_2O	Flow Rate m^3/min	Manometer "H_2O	Pressure (Pf)	Press. Ratio (Po/Pa)	Flow Rate m^3/min		
3.90	1.200	23.10	43.16	0.944	1.237	**3.08**	± 7%

Sampler Operating Flow Rate

Manometer "H_2O	Pressure (Pf)	Press. Ratio (Po/Pa)	Flow Rate m^3/min	Corrected Flow Rate	Acceptable Range
23.10	43.16	0.944	1.237	**1.199**	1.10 - 1.70

Calculations:

Pressure mmHg (Pf) - "H_2O * 1.86832

Pressure Ratio (Po/Pa) - 1-Pf/Pa

Orifice Flow Rate (Qa) - 1/Slope*(Sqrt("H2O*(Ta/Pa))-Intercept)

Sampler Flow Rate (Qa) - Taken from the look-up tables

Calibration Error - (Sampler Flow-Orifice Flow)/Orifice Flow*100

Corrected Flow Rate - Operating Flow*((100-Calibration Error)/100)

INQUEST
Environmental, Inc.

Lead Sampler Audit
Volumetric Flow Control

3609 Mojave Court, Suite E
Columbia, Missouri 65202
573-474-8110

Date	July 29, 2015	Auditor	John Kunkel
Operator	The Doe Run Company	Transfer Orifice	1882
Location	Park Hills Network	Slope (Qa)	1.04094
Station	St Joe Park	Intercept (Qa)	-0.00876
Sampler	#4 TSP	Temperature	31.8 °C / 305.0 °K
Flow Controller	P6792	Station Pressure	30.08 "Hg / 764.0 mmHg

Flow Rate Audit

Transfer Orifice		Sampler				Calibration Error %	Acceptable Range
Manometer "H_2O	Flow Rate m^3/min	Manometer "H_2O	Pressure (Pf)	Press. Ratio (Po/Pa)	Flow Rate m^3/min		
3.70	1.176	22.60	42.22	0.945	1.242	**5.61**	± 7%

Sampler Operating Flow Rate

Manometer "H_2O	Pressure (Pf)	Press. Ratio (Po/Pa)	Flow Rate m^3/min	Corrected Flow Rate	Acceptable Range
22.90	42.78	0.944	1.241	**1.171**	1.10 - 1.70

Calculations:

Pressure mmHg (Pf) - "H_2O * 1.86832

Pressure Ratio (Po/Pa) - 1-Pf/Pa

Orifice Flow Rate (Qa) - 1/Slope*(Sqrt("H2O*(Ta/Pa))-Intercept)

Sampler Flow Rate (Qa) - Taken from the look-up tables

Calibration Error - (Sampler Flow-Orifice Flow)/Orifice Flow*100

Corrected Flow Rate - Operating Flow*((100-Calibration Error)/100)

INQUEST
Environmental, Inc.

Lead Sampler Audit
Volumetric Flow Control

3609 Mojave Court, Suite E
Columbia, Missouri 65202
573-474-8110

Date	July 29, 2015	Auditor	John Kunkel
Operator	The Doe Run Company	Transfer Orifice	1882
Location	Park Hills Network	Slope (Qa)	1.04094
Station	Rivermines (Water Plant)	Intercept (Qa)	-0.00876
Sampler	TSP	Temperature	31.8 °C / 305.0 °K
Flow Controller	P4475	Station Pressure	30.08 "Hg / 764.0 mmHg

Flow Rate Audit

Transfer Orifice		Sampler				Calibration Error %	Acceptable Range
Manometer "H_2O	Flow Rate m^3/min	Manometer "H_2O	Pressure (Pf)	Press. Ratio (Po/Pa)	Flow Rate m^3/min		
3.70	1.176	24.40	45.59	0.940	1.232	**4.76**	± 7%

Sampler Operating Flow Rate

Manometer "H_2O	Pressure (Pf)	Press. Ratio (Po/Pa)	Flow Rate m^3/min	Corrected Flow Rate	Acceptable Range
24.50	45.77	0.940	1.232	**1.173**	1.10 - 1.70

Calculations:

Pressure mmHg (Pf) - "H_2O * 1.86832

Pressure Ratio (Po/Pa) - 1-Pf/Pa

Orifice Flow Rate (Qa) - 1/Slope*(Sqrt("H2O*(Ta/Pa))-Intercept)

Sampler Flow Rate (Qa) - Taken from the look-up tables

Calibration Error - (Sampler Flow-Orifice Flow)/Orifice Flow*100

Corrected Flow Rate - Operating Flow*((100-Calibration Error)/100)

INQUEST
Environmental, Inc.

Lead Sampler Audit
Volumetric Flow Control

3609 Mojave Court, Suite E
Columbia, Missouri 65202
573-474-8110

Date	July 29, 2015	Auditor	John Kunkel
Operator	The Doe Run Company	Transfer Orifice	1882
Location	Park Hills Network	Slope (Qa)	1.04094
Station	Rivermines (Quarry)	Intercept (Qa)	-0.00876
Sampler	#1 TSP	Temperature	31.8 °C / 305.0 °K
Flow Controller	P2940	Station Pressure	30.08 "Hg / 764.0 mmHg

Flow Rate Audit

Transfer Orifice		Sampler				Calibration Error %	Acceptable Range
Manometer "H_2O	Flow Rate m^3/min	Manometer "H_2O	Pressure (Pf)	Press. Ratio (Po/Pa)	Flow Rate m^3/min		
3.60	1.160	23.70	44.28	0.942	1.240	**6.90**	± 7%

Sampler Operating Flow Rate

Manometer "H_2O	Pressure (Pf)	Press. Ratio (Po/Pa)	Flow Rate m^3/min	Corrected Flow Rate	Acceptable Range
23.20	43.35	0.943	1.241	**1.155**	1.10 - 1.70

Calculations:

Pressure mmHg (Pf) - "H_2O * 1.86832

Pressure Ratio (Po/Pa) - 1-Pf/Pa

Orifice Flow Rate (Qa) - 1/Slope*(Sqrt("H2O*(Ta/Pa))-Intercept)

Sampler Flow Rate (Qa) - Taken from the look-up tables

Calibration Error - (Sampler Flow-Orifice Flow)/Orifice Flow*100

Corrected Flow Rate - Operating Flow*((100-Calibration Error)/100)

INQUEST
Environmental, Inc.

Lead Sampler Audit
Volumetric Flow Control

3609 Mojave Court, Suite E
Columbia, Missouri 65202
573-474-8110

Date	July 29, 2015	Auditor	John Kunkel		
Operator	The Doe Run Company	Transfer Orifice	1882		
Location	Park Hills Network	Slope (Qa)	1.04094		
Station	Rivermines (above quarry)	Intercept (Qa)	-0.00876		
Sampler	#1 TSP	Temperature	31.8 °C	305.0	°K
Flow Controller	P2941	Station Pressure	30.08 "Hg	764.0	mmHg

Flow Rate Audit

Transfer Orifice		Sampler				Calibration Error %	Acceptable Range
Manometer "H_2O	Flow Rate m^3/min	Manometer "H_2O	Pressure (Pf)	Press. Ratio (Po/Pa)	Flow Rate m^3/min		
3.70	1.176	23.20	43.35	0.943	1.243	**5.70**	± 7%

Sampler Operating Flow Rate

Manometer "H_2O	Pressure (Pf)	Press. Ratio (Po/Pa)	Flow Rate m^3/min	Corrected Flow Rate	Acceptable Range
22.90	42.78	0.944	1.244	**1.173**	1.10 - 1.70

Calculations:

Pressure mmHg (Pf) - "H_2O * 1.86832

Pressure Ratio (Po/Pa) - 1-Pf/Pa

Orifice Flow Rate (Qa) - 1/Slope*(Sqrt("H2O*(Ta/Pa))-Intercept)

Sampler Flow Rate (Qa) - Taken from the look-up tables

Calibration Error - (Sampler Flow-Orifice Flow)/Orifice Flow*100

Corrected Flow Rate - Operating Flow*((100-Calibration Error)/100)

Calibration Orifice Certification Worksheet

TISCH ENVIRONMENTAL, INC.
145 SOUTH MIAMI AVE
VILLAGE OF CLEVES, OH
45002
513.467.9000
877.263.7610 TOLL FREE
513.467.9009 FAX

TISCH Environmental

ORIFICE TRANSFER STANDARD CERTIFICATION WORKSHEET TE-5028A

Date - Jan 13, 2015 Rootsmeter S/N 9833620 Ta (K) - 292
Operator Tisch Orifice I.D. - 1882 Pa (mm) - 765.81

PLATE OR VDC #	VOLUME START (m3)	VOLUME STOP (m3)	DIFF VOLUME (m3)	DIFF TIME (min)	METER DIFF Hg (mm)	ORFICE DIFF H2O (in.)
1	NA	NA	1.00	1.3360	4.3	1.50
2	NA	NA	1.00	1.0560	6.8	2.50
3	NA	NA	1.00	0.9570	8.2	3.00
4	NA	NA	1.00	0.8870	9.5	3.50
5	NA	NA	1.00	0.6670	16.5	6.00

DATA TABULATION

Vstd	(x axis) Qstd	(y axis)		Va	(x axis) Qa	(y axis)
1.0225	0.7654	1.2420		0.9943	0.7443	0.7563
1.0191	0.9651	1.6034		0.9910	0.9385	0.9763
1.0173	1.0630	1.7564		0.9892	1.0337	1.0695
1.0155	1.1449	1.8972		0.9875	1.1133	1.1552
1.0061	1.5084	2.4840		0.9784	1.4668	1.5125
Qstd slope (m) =		1.66236		Qa slope (m) =		1.04094
intercept (b) =		-0.01438		intercept (b) =		-0.00676
coefficient (r) =		0.99927		coefficient (r) =		0.99927
y axis = SQRT[H2O(Pa/760)(298/Ta)]				y axis = SQRT[H2O(Ta/Pa)]		

CALCULATIONS

Vstd = Diff. Vol[(Pa-Diff. Hg)/760](298/Ta)
Qstd = Vstd/Time

Va = Diff Vol [(Pa-Diff Hg)/Pa]
Qa = Va/Time

For subsequent flow rate calculations:

Qstd = 1/m{[SQRT(H2O(Pa/760)(298/Ta))]- b}
Qa = 1/m{[SQRT H2O(Ta/Pa)]- b}

Meteorological Sensor's Accuracy Checks

Inquest Environmental, Inc.

Wind Direction Sensor Performance Audit

Operator: The Doe Run Co.
Location: Big River
Station Name: Meteorological System
Technician: J Kunkel / M Kunkel

Sensor Mfg: RM Young
Sensor Model: Wind Monitor AQ
Serial Number: 128618
Sensor Height: 10.0 Meters

Date: 07/29/2015
Start Time: 10:30
Stop Time: 11:30

Station Declination: 1.1 Deg
Measured Angle: 180.0 Deg
Corrected Angle: 181.1 Deg
Alignment Error: -1.1 Deg

Vane Angle	Data Logger	Results	
		Difference	Total Error
Degrees	Degrees	± 3 Deg Limit	± 5 Deg Limit
0/360	1.1	1.1	0.0
90	91.9	1.9	0.8
180	181.1	1.1	0.0
270	271.9	1.9	0.8

Average Difference (Degrees)	1.5
Average Total Error (Degrees)	0.4

Audit Device	Wind Vane Alignment	Direction
Type	Pocket Transit	Vane Angle Fixture
Mfg.	Brunton	R.M. Young
Model	5008	18212
Serial No.	5080304492	None

Comments: Wind direction was verified by determining the orientation of the sensor in respect to True North. This was measured using a tri-pod mounted transit aligned along the length of the sensor while locked from rotating. A magnetic declination of 1.1 degrees was used to determine True North. The linearity of the sensor was determined by aligning the sensor to an indexed test fixture provided by the manufacturer. The four cardinal directions were verified using the fixture. No adjustments were made to the sensor.

Inquest Environmental, Inc.
Wind Speed Sensor Performance Audit

Operator: The Doe Run Co.
Location: Big River
Station Name: Meteorological System
Auditor(s): J Kunkel / M Kunkel

Date: 07/29/2015
Start Time: 10:30
Stop Time: 11:30

Sensor Mfg: RM Young
Sensor Model: Wind Monitor AQ
Serial Number: 128618
Sensor Height: 10.0 Meters

Audit Standard		DAS Response		Limit
RPM	M/S	M/S	Difference	M/S
Zero	0.00	0.00	0.00	0.25
300	1.54	1.56	0.02	0.25
600	3.07	3.07	0.00	0.25
1200	6.14	6.15	0.01	0.56
1800	9.22	9.21	-0.01	0.71
3600	18.43	18.44	0.01	1.17
5400	27.65	27.63	-0.02	1.63
7200	36.86	36.85	-0.01	2.09
Average			0.00	

± (0.25 m/s + 5%)

Audit Device	Anemometer Drive
Type	Variable Speed
Mfg.	R.M. Young
Model	18801
Serial No.	CAO1631

Comments: Wind speed was verified using a variable speed anemometer drive. The propellor was removed from the sensor and the drive was connected using a flexible connector. The sensor was then rotated in the appropiate direction at several different speeds. Sensor responses were taken from the data logger. No adjustments were made to the sensor.

Inquest Environmental, Inc.
Temperature Sensor Performance Audit

Operator: The Doe Run Co.
Location: Big River
Station Name: Meteorological System
Technician: J Kunkel / M Kunkel

Date: 07/29/2015
Start Time: 10:30
Stop Time: 11:30

Sensor Information

Sensor Mfg: Climatronics
Sensor Model: NA
Serial Number: NA
Sensor Height: 2 meters

Audit Device	Sensor	
°C	Data Logger °C	Difference °C
0.5	0.5	0.0
34.1	33.9	-0.2
44.0	43.9	-0.1
	Average	-0.1

Note: The limit for each point is +/- 0.5 °C

Audit Device	
Type	Digital Thermometer
Mfg.	Control Company
Model	15-077-8
Serial No.	221381405

Comments: The temperature is verified by co-locating the sensor with a certified digital thermometer. The verification is conducted at three levels using two water baths (iced and hot water) and the ambient temperature. The sensor error was determined by comparing the sensor's data logger response to the display on the certified digital thermometer. No adjustments were made to the sensor.

Inquest Environmental, Inc.

Barometric Pressure Sensor Performance Audit

Operator	The Doe Run Co.	Date	07/29/2015
Location	Big River	Start Time	10:30
Station Name	Meteorological System	Stop Time	11:30
Technician	J Kunkel / M Kunkel		

Sensor Mfg	Setra
Sensor Model	276
Serial Number	2626447

Audit Device	Data Logger Response	
mm HG	BP mm HG	Difference mm HG
741.20	744.60	3.40

Note: Limit is +/- 7.5 mm HG.

Audit Device	
Type	Digital Barometer
Mfg.	AIR
Model	AIR-HB-1A
Serial No.	6G3745

Comments: The barometric pressure is verified by co-locating the sensor with a certified digital barometer. The verification was conducted at one level after allowing the sensor and calibration device ample time to stabilize. The sensor error was determined by comparing the sensor's data logger response to the display on the certified digital barometer. No adjustments were made to the sensor.

Inquest Environmental, Inc.

Precipitation Gauge Performance Audit

Operator	The Doe Run Co	Date	07/29/2015
Location	Big River	Start Time	10:30
Station Name	Meteorological System	Stop Time	11:30
Technician	J Kunkel / M Kunkel		

Sensor Mfg	Texas Electronics
Sensor Model	TR525I
Serial Number	36611-805
Diameter (inches)	6.00

Audit Device	Data Logger Response	
Known Tips	Gauge Tips	Difference %
96.00	90.00	-6.25

Note: Limit is +/- 10%.

Audit Device	
Type	Graduated Beaker
Mfg.	Texas Instruments
Model	FC-525
Serial No.	NA

Comments: The precipitation gauge output was verified using a field calibration kit supplied by the manufacturer. The kit consists of a graduated beaker and a calibration funnel using a precision orifice at the water outlet. Water was measured in the beaker and poured into the funnel while mounted on the gauge. The amount of precipitation recorded by the data logger was then compared to the known amount of water passing through the funnel. 100 tips equals one inch of rainfall. The gauge was cleaned and no adjustments were made.

Meteorological Audit Devices Certifications

BRUNTON OUTDOOR GROUP

CERTIFICATE OF CALIBRATION

Equipment Owner

Name: Inquest Environmental Mitch Kunkel

Address: 3609 Majeve Court, Ste E

Columbia MO 65203

Calibration traceable to the National institute of Standards and Technology in accordance with MIL-STD-45662A has been accomplish on the instrument listed below by comparison with standards maintained by the Brunton Outdoor Group. The accuracy and stability of all standards maintained by the Brunton Outdoor Group are traceable to national standards maintained by the National Institute of Standards and Technology in Washington, D.C. and Boulder, CO. Completed record of all work preformed is maintained by the Brunton Outdoor Group and is available for inspection upon request.

This unit has been calibrated to Lietz TM10E serial number 30937 traceable to N.B.S. Number 738227675 this July Day 30 20 14.

Description Pocket Transit

Purchase Order 256430329

Order Number 50-070367

Model Number F-5008

Serial Number 508030492

Calibration Date 7/30/14

Recalibration Date 7/30/15

Signed Eli Ayyalley 7/30/14

Quality Control Coordinator

CERTIFICATE OF CALIBRATION AND TESTING

MODEL: **18801** (Comprised of Models 18820 Control Unit & 18830 Motor Assembly)
SERIAL NUMBER: CA01631

R. M. Young Company certifies that the above equipment was inspected and calibrated prior to shipment in accordance with established manufacturing and testing procedures. Standards established by R.M. Young Company for calibrating the measuring and test equipment used in controlling product quality are traceable to the National Institute of Standards and Technology.

Nominal Motor Rpm	Output Frequency Hz (1)	Calculated Rpm (2)	Indicated Rpm (3)
600	320	600	600
1200	640	1200	1200
2400	1280	2400	2400
4200	2240	4200	4200
6,000	3200	6000	6000
8,100	4320	8100	8100
9,900	5280	9900	9900
☒ Clockwise and Counterclockwise rotation verified			

(1) Measured at the optical encoder output.
(2) Frequency output produces 32 pulses per revolution of motor shaft.
(3) Indicated on the Control Unit LCD display.

* Indicates out of tolerance

☒ No Calibration Adjustments Required ☐ As Found ☐ As Left

Traceable frequency meter used in calibration Model: DP5740 SN: 4863

Date of inspection 10 Dec 2014
Inspection Interval One Year

Tested By EC

Calibration
Certificate No. 1750.01

Calibration complies with ISO/IEC 17025, ANSI/NCSL Z540-1, and 9001

Cert. No.: 4000-6726396

Traceable® Certificate of Calibration for Digital Thermometer

Cust ID:Inquest Environmental Inc., 3609 Mojave Court, Suite E, Columbia, MO 65202 U.S.A. (RMA:995292)

Instrument Identification:

Model Numbers: 15-077-8, 11705843 S/N: 221381404 Manufacturer: Control Company

Model: 15-077-7 S/N: 51202300

Standards/Equipment:

Description	Serial Number	Due Date	NIST Traceable Reference
Temperature Calibration Bath TC-179	A45240		
Thermistor Module	A17118	3/03/16	1000371058
Temperature Probe	3039	4/02/16	15--A0P2S-20-1
Temperature Calibration Bath TC-231	A79341		
Thermistor Module	A27129	11/04/15	1000365407
Temperature Probe	5202	11/19/16	6-CV9Y2-1-1
Temperature Calibration Bath TC-309	B3A444		
Thermistor Module	A27129	11/04/15	1000365407
Temperature Probe	5267	11/19/16	6-CV9Y0-1-1

Certificate Information:

Technician: 68 Procedure: CAL-06 Cal Date: 4/28/15 Due Date: 4/28/16

Test Conditions: 22.4°C 47.0 %RH 1012 mBar

Calibration Data:

Unit(s)	Nominal	As Found	In Tol	Nominal	As Left	In Tol	Min	Max	±U	TUR
°C	-0.001	0.011	Y	-0.001	-0.001	Y	-0.051	0.049	0.013	3.8:1
°C	24.999	24.999	Y	24.999	25.000	Y	24.949	25.049	0.014	3.6:1
°C	60.003	60.007	Y	60.003	60.001	Y	59.953	60.053	0.014	3.6:1
°C	100.000	100.012	Y	100.000	100.004	Y	99.950	100.050	0.014	3.6:1

This Instrument was calibrated using Instruments Traceable to National Institute of Standards and Technology.

A Test Uncertainty Ratio of at least 4:1 is maintained unless otherwise stated and is calculated using the expanded measurement uncertainty. Uncertainty evaluation includes the instrument under test and is calculated in accordance with the ISO "Guide to the Expression of Uncertainty in Measurement" (GUM). The uncertainty represents an expanded uncertainty using a coverage factor k=2 to approximate a 95% confidence level. In tolerance conditions are based on test results falling within specified limits with no reduction by the uncertainty of the measurement. The results contained herein relate only to the item calibrated. This certificate shall not be reproduced except in full, without written approval of Control Company.

Nominal=Standard's Reading; As Left=Instrument's Reading; In Tol=In Tolerance; Min/Max=Acceptance Range; ±U=Expanded Measurement Uncertainty; TUR=Test Uncertainty Ratio; Accuracy=±(Max-Min)/2; Min = As Left Nominal(Rounded) - Tolerance; Max = As Left Nominal(Rounded) + Tolerance; Date=MM/DD/YY

Nicol Rodriguez, Quality Manager

Aaron Judice, Technical Manager

Maintaining Accuracy:

In our opinion once calibrated your Digital Thermometer should maintain its accuracy. There is no exact way to determine how long calibration will be maintained. Digital Thermometers change little, if any at all, but can be affected by aging, temperature, shock, and contamination.

Recalibration:

For factory calibration and re-certification traceable to National Institute of Standards and Technology contact Control Company.

CONTROL COMPANY 4455 Rex Road Friendswood, TX 77546 USA
Phone 281 482-1714 Fax 281 482-9448 service@control3.com www.control3.com

HASS INSTRUMENT CORPORATION
6711 OLD BRANCH AVENUE • CAMP SPRINGS, MD 20748-6990 ◦ (301) 449-5454 • FAX (301) 449-5455

CALIBRATION REPORT

BAROMETER/ALTIMETER
AIR Model AIR-HB-1A
Serial No. 6G3745

TEST POINT	TEST PRESSURE	DIGITAL READOUT	READOUT ERROR	CORRECTION REQUIRED
1	930.00	931.9	+1.9	-1.9
2	970.00	971.9	+1.9	-1.9
3	1010.00	1011.9	+1.9	-1.9
4	1050.00	1051.9	+1.9	-1.9
5	1011.97	1013.9	+1.9	-1.9

NOTES:

1. All data are in Millibars (hPA) and were taken at 70 F (21 C).
2. To correct the Digital Readout of the instrument, either algebraically add the CORRECTION REQUIRED to, or algebraically subtract the READOUT ERROR from, the readout shown on the instrument.
3. The TEST PRESSURE was generated using Type A-1 Barometer S/N 3327, and was approached in an increasing-pressure direction.
4. The TEST PRESSURE for TEST POINT 5 was ambient atmospheric pressure.
5. The BAROMETER/ALTIMETER was horizontal during the calibration.
6. The LCD screen of the BAROMETER/ALTIMETER has some trash in the center of the display, but it does not interfer with the readout.
7. Although the Digital Readout of the instrument can be adjusted to incorporate the average CORRECTION REQUIRED, this has not been done.

Calibration Date: 10 March 2015

By: Bernard I. Hass

Bernard I. Hass

(SEAL)

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

November 18, 2015

Amy Sanders
The Doe Run Company
P. O. Box 500
Viburnum, MO 65566

RE: Project: NPDES (Rivermines)
Pace Project No.: 60207042

Dear Amy Sanders:
Enclosed are the analytical results for sample(s) received by the laboratory on November 11, 2015. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Jamie Church
jamie.church@pacelabs.com
Project Manager

Enclosures

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

CERTIFICATIONS

Project: NPDES (Rivermines)
Pace Project No.: 60207042

Kansas Certification IDs
9608 Loiret Boulevard, Lenexa, KS 66219
WY STR Certification #: 2456.01
Arkansas Certification #: 15-016-0
Illinois Certification #: 003097
Iowa Certification #: 118
Kansas/NELAP Certification #: E-10116
Louisiana Certification #: 03055
Nevada Certification #: KS000212008A
Oklahoma Certification #: 9205/9935
Texas Certification #: T104704407
Utah Certification #: KS00021

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

SAMPLE SUMMARY

Project: NPDES (Rivermines)
Pace Project No.: 60207042

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60207042001	39579/RIVERMINES DOWNSTREAM	Water	11/10/15 10:36	11/11/15 08:45
60207042002	39580/RIVERMINES UPSTREAM	Water	11/10/15 10:58	11/11/15 08:45
60207042003	39581/RIVERMINES 001	Water	11/10/15 10:45	11/11/15 08:45

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SAMPLE ANALYTE COUNT

Project: NPDES (Rivermines)
Pace Project No.: 60207042

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60207042001	**39579/RIVERMINES DOWNSTREAM**	EPA 200.7	SMW	6	PASI-K
		EPA 200.7	NDJ	3	PASI-K
		SM 2540D	CRS	1	PASI-K
		EPA 300.0	AJM	1	PASI-K
60207042002	**39580/RIVERMINES UPSTREAM**	EPA 200.7	SMW	6	PASI-K
		EPA 200.7	NDJ	3	PASI-K
		SM 2540D	CRS	1	PASI-K
		EPA 300.0	AJM	1	PASI-K
60207042003	**39581/RIVERMINES 001**	EPA 200.7	SMW	3	PASI-K
		SM 2540D	CRS	1	PASI-K
		SM 2540F	CRS	1	PASI-K
		EPA 300.0	AJM	1	PASI-K

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ANALYTICAL RESULTS

Project: NPDES (Rivermines)
Pace Project No.: 60207042

Sample: 39579/RIVERMINES DOWNSTREAM **Lab ID: 60207042001** Collected: 11/10/15 10:36 Received: 11/11/15 08:45 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Cadmium	**2.2J**	ug/L	5.0	0.56	1	11/12/15 14:00	11/13/15 13:37	7440-43-9	
Calcium	**99600**	ug/L	100	5.2	1	11/12/15 14:00	11/13/15 13:37	7440-70-2	
Lead	**7.3**	ug/L	5.0	1.9	1	11/12/15 14:00	11/13/15 13:37	7439-92-1	
Magnesium	**37700**	ug/L	50.0	13.3	1	11/12/15 14:00	11/13/15 13:37	7439-95-4	
Total Hardness by 2340B	**404000**	ug/L	500		1	11/12/15 14:00	11/13/15 13:37		
Zinc	**2730**	ug/L	50.0	2.6	1	11/12/15 14:00	11/13/15 13:37	7440-66-6	
200.7 Metals, Dissolved (LF)	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Cadmium, Dissolved	**1.4J**	ug/L	5.0	0.56	1	11/17/15 16:40	11/18/15 12:33	7440-43-9	
Lead, Dissolved	**3.1J**	ug/L	5.0	1.9	1	11/17/15 16:40	11/18/15 12:33	7439-92-1	
Zinc, Dissolved	**2770**	ug/L	50.0	2.6	1	11/17/15 16:40	11/18/15 12:33	7440-66-6	D9
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**8.0**	mg/L	5.0	5.0	1		11/12/15 12:23		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**240**	mg/L	20.0	4.7	20		11/12/15 18:51	14808-79-8	

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ANALYTICAL RESULTS

Project: NPDES (Rivermines)
Pace Project No.: 60207042

Sample: 39580/RIVERMINES UPSTREAM **Lab ID: 60207042002** Collected: 11/10/15 10:58 Received: 11/11/15 08:45 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Cadmium	**<0.56**	ug/L	5.0	0.56	1	11/12/15 14:00	11/13/15 13:41	7440-43-9	
Calcium	**42600**	ug/L	100	5.2	1	11/12/15 14:00	11/13/15 13:41	7440-70-2	
Lead	**3.6J**	ug/L	5.0	1.9	1	11/12/15 14:00	11/13/15 13:41	7439-92-1	
Magnesium	**27400**	ug/L	50.0	13.3	1	11/12/15 14:00	11/13/15 13:41	7439-95-4	
Total Hardness by 2340B	**219000**	ug/L	500		1	11/12/15 14:00	11/13/15 13:41		
Zinc	**5.2J**	ug/L	50.0	2.6	1	11/12/15 14:00	11/13/15 13:41	7440-66-6	
200.7 Metals, Dissolved (LF)	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Cadmium, Dissolved	**0.73J**	ug/L	5.0	0.56	1	11/17/15 16:40	11/18/15 12:35	7440-43-9	
Lead, Dissolved	**2.6J**	ug/L	5.0	1.9	1	11/17/15 16:40	11/18/15 12:35	7439-92-1	
Zinc, Dissolved	**25.6J**	ug/L	50.0	2.6	1	11/17/15 16:40	11/18/15 12:35	7440-66-6	D9
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**5.0**	mg/L	5.0	5.0	1		11/12/15 12:23		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**39.7**	mg/L	5.0	1.2	5		11/13/15 12:18	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: NPDES (Rivermines)
Pace Project No.: 60207042

Sample: 39581/RIVERMINES 001 **Lab ID: 60207042003** Collected: 11/10/15 10:45 Received: 11/11/15 08:45 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Cadmium	**10.1**	ug/L	5.0	0.56	1	11/12/15 14:00	11/13/15 13:44	7440-43-9	
Lead	**12.3**	ug/L	5.0	1.9	1	11/12/15 14:00	11/13/15 13:44	7439-92-1	
Zinc	**11300**	ug/L	50.0	2.6	1	11/12/15 14:00	11/13/15 13:44	7440-66-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**9.0**	mg/L	5.0	5.0	1		11/12/15 12:24		
2540F Total Settleable Solids	Analytical Method: SM 2540F								
Total Settleable Solids	**<0.20**	mL/L/hr	0.20	0.20	1		11/11/15 12:45		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**824**	mg/L	50.0	11.8	50		11/13/15 12:33	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: NPDES (Rivermines)
Pace Project No.: 60207042

QC Batch: MPRP/33894 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60207042001, 60207042002, 60207042003

METHOD BLANK: 1667617 Matrix: Water
Associated Lab Samples: 60207042001, 60207042002, 60207042003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Cadmium	ug/L	<0.56	5.0	0.56	11/13/15 12:54	
Calcium	ug/L	<5.2	100	5.2	11/13/15 12:54	
Lead	ug/L	<1.9	5.0	1.9	11/13/15 12:54	
Magnesium	ug/L	<13.3	50.0	13.3	11/13/15 12:54	
Total Hardness by 2340B	ug/L	2.2J	500		11/13/15 12:54	
Zinc	ug/L	<2.6	50.0	2.6	11/13/15 12:54	

LABORATORY CONTROL SAMPLE: 1667618

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Cadmium	ug/L	1000	958	96	85-115	
Calcium	ug/L	10000	9290	93	85-115	
Lead	ug/L	1000	997	100	85-115	
Magnesium	ug/L	10000	9270	93	85-115	
Total Hardness by 2340B	ug/L		61400			
Zinc	ug/L	1000	945	94	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1667619 1667620

Parameter	Units	60207040001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Cadmium	ug/L	<0.56	1000	1000	904	962	90	96	70-130	6	20	
Calcium	ug/L	90500	10000	10000	98700	101000	83	109	70-130	3	20	
Lead	ug/L	6.3	1000	1000	903	961	90	96	70-130	6	20	
Magnesium	ug/L	49900	10000	10000	58300	60300	84	103	70-130	3	20	
Total Hardness by 2340B	ug/L	432000			487000	501000				3		
Zinc	ug/L	103	1000	1000	972	1030	87	92	70-130	5	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

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QUALITY CONTROL DATA

Project: NPDES (Rivermines)
Pace Project No.: 60207042

QC Batch: MPRP/33964
QC Batch Method: EPA 200.7
Analysis Method: EPA 200.7
Analysis Description: 200.7 Metals, Dissolved
Associated Lab Samples: 60207042001, 60207042002

METHOD BLANK: 1670672 Matrix: Water
Associated Lab Samples: 60207042001, 60207042002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Cadmium, Dissolved	ug/L	<0.56	5.0	0.56	11/18/15 12:17	
Lead, Dissolved	ug/L	<1.9	5.0	1.9	11/18/15 12:17	
Zinc, Dissolved	ug/L	<2.6	50.0	2.6	11/18/15 12:17	

LABORATORY CONTROL SAMPLE: 1670673

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Cadmium, Dissolved	ug/L	1000	996	100	85-115	
Lead, Dissolved	ug/L	1000	1020	102	85-115	
Zinc, Dissolved	ug/L	1000	1010	101	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1670674 1670675

Parameter	Units	60207040001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Cadmium, Dissolved	ug/L	0.57J	1000	1000	1050	1010	105	101	70-130	5	20	
Lead, Dissolved	ug/L	6.3	1000	1000	1060	1010	105	100	70-130	5	20	
Zinc, Dissolved	ug/L	89.7	1000	1000	1130	1080	104	99	70-130	5	20	

MATRIX SPIKE SAMPLE: 1670676

Parameter	Units	60207318003 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Cadmium, Dissolved	ug/L	<0.56	1000	1020	102	70-130	
Lead, Dissolved	ug/L	13.0	1000	1020	101	70-130	
Zinc, Dissolved	ug/L	13.5J	1000	1020	101	70-130	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: NPDES (Rivermines)
Pace Project No.: 60207042

QC Batch: WET/58334 Analysis Method: SM 2540D
QC Batch Method: SM 2540D Analysis Description: 2540D Total Suspended Solids
Associated Lab Samples: 60207042001, 60207042002, 60207042003

METHOD BLANK: 1667249 Matrix: Water
Associated Lab Samples: 60207042001, 60207042002, 60207042003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Suspended Solids	mg/L	<5.0	5.0	5.0	11/12/15 12:21	

SAMPLE DUPLICATE: 1667250

Parameter	Units	60207017001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	15.0	17.0	12	10	D6

SAMPLE DUPLICATE: 1667251

Parameter	Units	60207026003 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	158	152	4	10	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: NPDES (Rivermines)
Pace Project No.: 60207042

QC Batch: WETA/36872
QC Batch Method: EPA 300.0
Analysis Method: EPA 300.0
Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60207042001

METHOD BLANK: 1667309 Matrix: Water
Associated Lab Samples: 60207042001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Sulfate	mg/L	<0.24	1.0	0.24	11/12/15 16:32	

LABORATORY CONTROL SAMPLE: 1667310

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	5	4.6	93	90-110	

MATRIX SPIKE SAMPLE: 1667311

Parameter	Units	60207031001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	52.6	250	282	92	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1667312 1667313

Parameter	Units	60207047001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	ND	1000	1000	1060	1070	91	92	80-120	1	15	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: NPDES (Rivermines)
Pace Project No.: 60207042

QC Batch: WETA/36900 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60207042002, 60207042003

METHOD BLANK: 1668180 Matrix: Water
Associated Lab Samples: 60207042002, 60207042003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Sulfate	mg/L	<0.24	1.0	0.24	11/13/15 10:32	

LABORATORY CONTROL SAMPLE: 1668181

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	5	4.8	96	90-110	

MATRIX SPIKE SAMPLE: 1668182

Parameter	Units	60207041004 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	494	250	710	86	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1668183 1668184

Parameter	Units	60207160001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	36.5	25	25	59.8	60.0	93	94	80-120	0	15	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: NPDES (Rivermines)
Pace Project No.: 60207042

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-K	Pace Analytical Services - Kansas City

ANALYTE QUALIFIERS

D6	The relative percent difference (RPD) between the sample and sample duplicate exceeded laboratory control limits.
D9	Dissolved result is greater than the total. Data is within laboratory control limits.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: NPDES (Rivermines)
Pace Project No.: 60207042

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60207042001	39579/RIVERMINES DOWNSTREAM	EPA 200.7	MPRP/33894	EPA 200.7	ICP/24932
60207042002	39580/RIVERMINES UPSTREAM	EPA 200.7	MPRP/33894	EPA 200.7	ICP/24932
60207042003	39581/RIVERMINES 001	EPA 200.7	MPRP/33894	EPA 200.7	ICP/24932
60207042001	39579/RIVERMINES DOWNSTREAM	EPA 200.7	MPRP/33964	EPA 200.7	ICP/24976
60207042002	39580/RIVERMINES UPSTREAM	EPA 200.7	MPRP/33964	EPA 200.7	ICP/24976
60207042001	39579/RIVERMINES DOWNSTREAM	SM 2540D	WET/58334		
60207042002	39580/RIVERMINES UPSTREAM	SM 2540D	WET/58334		
60207042003	39581/RIVERMINES 001	SM 2540D	WET/58334		
60207042003	39581/RIVERMINES 001	SM 2540F	WET/58319		
60207042001	39579/RIVERMINES DOWNSTREAM	EPA 300.0	WETA/36872		
60207042002	39580/RIVERMINES UPSTREAM	EPA 300.0	WETA/36900		
60207042003	39581/RIVERMINES 001	EPA 300.0	WETA/36900		

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Sample Condition Upon Receipt

WO# : 60207042

60207042

Client Name: DRC

Optional
Proj Due Date:
Proj Name:

Courier: FedEx ☑ UPS ☐ VIA ☐ Clay ☐ PEX ☐ ECI ☐ Pace ☐ Other ☐ Client ☐

Tracking #: 7749 3877 3197 Pace Shipping Label Used? Yes ☐ No ☑

Custody Seal on Cooler/Box Present: Yes ☑ No ☐ Seals intact: Yes ☑ No ☐

Packing Material: Bubble Wrap ☐ Bubble Bags ☐ Foam ☐ None ☑ Other ☐

Thermometer Used: CF +0.6 T-239 / CF +0.6 T-262 **Type of Ice:** (Wet) Blue None ☐ Samples received on ice, cooling process has begun.
(circle one)

Cooler Temperature: 3.0

Date and initials of person examining contents: PV 11/11/15

Temperature should be above freezing to 6°C

Chain of Custody present:	☑Yes ☐No ☐N/A	1.
Chain of Custody filled out:	☑Yes ☐No ☐N/A	2.
Chain of Custody relinquished:	☑Yes ☐No ☐N/A	3.
Sampler name & signature on COC:	☑Yes ☐No ☐N/A	4.
Samples arrived within holding time:	☑Yes ☐No ☐N/A	5.
Short Hold Time analyses (<72hr):	☑Yes ☐No ☐N/A	6. S·S
Rush Turn Around Time requested:	☐Yes ☑No ☐N/A	7.
Sufficient volume:	☑Yes ☐No ☐N/A	8.
Correct containers used:	☑Yes ☐No ☐N/A	
Pace containers used:	☑Yes ☐No ☐N/A	9.
Containers intact:	☑Yes ☐No ☐N/A	10.
Unpreserved 5035A soils frozen w/in 48hrs?	☐Yes ☐No ☑N/A	11.
Filtered volume received for dissolved tests?	☐Yes ☐No ☑N/A	12.
Sample labels match COC:	☑Yes ☐No ☐N/A	
Includes date/time/ID/analyses Matrix: WT		13.
All containers needing preservation have been checked.	☑Yes ☐No ☐N/A	
All containers needing preservation are found to be in compliance with EPA recommendation.	☑Yes ☐No ☐N/A	14.
Exceptions: VOA, Coliform, O&G, WI-DRO (water)	☐Yes ☑No	Initial when completed / Lot # of added preservative
Trip Blank present:	☐Yes ☐No ☑N/A	
Pace Trip Blank lot # (if purchased):		15.
Headspace in VOA vials (>6mm):	☐Yes ☐No ☑N/A	16.
Project sampled in USDA Regulated Area:	☐Yes ☐No ☑N/A	17. List State:
Additional labels attached to 5035A vials in the field?	☐Yes ☐No ☑N/A	18.

Client Notification/ Resolution: Copy COC to Client? Y / N Field Data Required? Y / N

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: Jessica Church 11/11/15 Date: _____

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

THE DOE RUN COMPANY

Section A — **Required** Client Information:

Company:	The Doe Run Company
Address:	PO Box 500
Email To:	asanders@doerun.com
Phone: (573) 689-4535	Fax: (573) 244-8179
Requested Due Date/TAT:	5 To 7 Days

Section B — **Required** Project Information:

Report To:	Amy Sanders
Copy To:	
Purchase Order No.:	
Project Name:	NPDES (Rivermines)
Project Number:	

Section C — Invoice Information:

Attention:	Amy Sanders
Company Name:	The Doe Run Company
Address:	PO Box 500, Viburnum, MO 65566
Pace Quote Reference:	
Pace Project Manager:	
Pace Profile #:	

REGULATORY AGENCY: ☐ NPDES ☐ GROUND WATER ☐ UST ☐ RCRA

Site Location STATE: MO

Page: 1 of 1

COC#: 2939

6020742

Section C — Required Sample Information

Valid Matrix Codes: MATRIX (WATER, WASTE WATER, SOIL/SOLID) / CODE (WT, WW, SL)

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED DATE/TIME: COMPOSITE START DATE (mm/dd/yy)	COMPOSITE START TIME (Military)	COMPOSITE END / GRAB DATE (mm/dd/yy)	COMPOSITE END / GRAB TIME (Military)	SAMPLE TEMP AT COLLECTION	Total # OF CONTAINERS	Bottles / Preservatives: 250 mL Unpreserved	500 mL Unpreserved	1 L Unpreserved	250 mL Nitric	250 mL Amber Glass H_2SO_4	250 mL Plastic H_2SO_4	1000 mL Amber HCL	250 mL ZnAc/NaOH	500 mL Amber Glass H_2SO_4	Requested Analysis Filtered (Y/N)	*See Additional Comments Below / Analysis Test	SEMO Lab Project No / Lab I.D.
																			N N N N N N N N N N N N N N N N		
1	39579 IBP3N2O IBP2U	WT	G			11/10/15	1036		2		1		1						CD-D, PB-D, ZN-D, HARD, SO4, CD-T, PB-T, TSS-T, ZN-T	Rivermines Downstre	001
2																					
3	39580 ↓ ↓	WT	G			11/10/15	1058		2		1		1						CD-D, PB-D, ZN-D, HARD, SO4, CD-T, PB-T, TSS-T, ZN-T	Rivermines Upstrean	002
4																					
5	39581 ↓ ↓ IBP1U	WW	G			11/10/15	1045		3	1		1	1						SO4, SS, TSS, CD-T, PB-T, ZN-T	Rivermines 001	003
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ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME (Military)	ACCEPTED BY / AFFILIATION	DATE	TIME (Military)	SAMPLE CONDITIONS: Temp in °C	pH in SU	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)
*200.7 Total Recoverable and Dissolved Metals	L Hopkins DRC	11/10/15	1236		11/11/15	0845	3.0		Y	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Larry Hopkins

SIGNATURE of SAMPLER: [signature]

DATE Signed (MM/DD/YY): 11/10/15